



# NEC'S NPN SILICON EPITAXIAL TRANSISTOR

## NE68939

### FEATURES

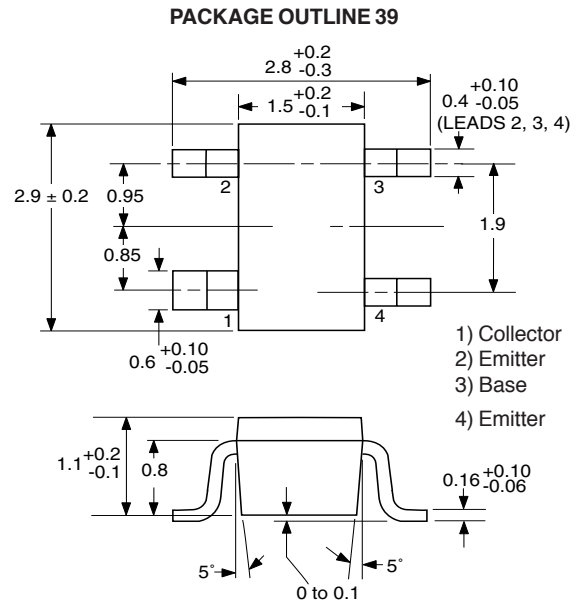
- **OUTPUT POWER AT 1dB COMPRESSION POINT:**  
24.5 dBm TYP @F = 1.9 GHz, VCE = 3.6 V, Class AB, Duty 1/8
- **4 PIN MINI MOLD PACKAGE:** NE68939

### DESCRIPTION

NEC's NE68939 is a low voltage, NPN Silicon Bipolar Transistor for pulsed power applications. The device is designed to operate from a 3.6 V supply, and deliver over 1/4 watt of power output at frequencies up to 2.0 GHz with a 1:8 duty cycle. These characteristics make it an ideal device for TX driver stage in a 1.9 GHz digital cordless telephone (DECT or PHS). The part is supplied in a SOT-143 (SC-61) 4-pin Mini-mold package and is available on tape and reel.

The NE68939 transistors are manufactured to NEC's stringent quality assurance standards to ensure highest reliability and consistent superior performance.

### OUTLINE DIMENSIONS (Units in mm)



### ELECTRICAL CHARACTERISTICS (TA = 25 °C)

PART NUMBER		NE68939			
PACKAGE CODE		39			
SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
ICBO	Collector Cutoff Current, VCB = 5 V, IE = 0	μA			2.5
IEBO	Emitter Cutoff Current, VEB = 1 V, IC = 0	μA			2.5
hFE	DC Current Gain, VCE = 3.6 V, IC = 100 mA		30		
P-1	Output Power	dBm		24.5	
Gp	Power Gain	dB	6.5	8	
ηC	Collector Efficiency	%	50	62	
TON	Maximum Device On Time	Ms			10.0

VCE = 3.6 V, f = 1.9 GHz  
ICq = 2 mA (Class AB)  
Duty 1/8

**ABSOLUTE MAXIMUM RATINGS<sup>1</sup>** (T<sub>A</sub> = 25 °C)

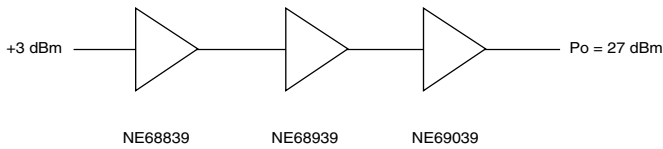
SYMBOLS	PARAMETERS	UNITS	RATINGS
V <sub>CB0</sub>	Collector to Base Voltage	V	9.0
V <sub>CEO</sub>	Collector to Emitter Voltage	V	6.0
V <sub>EBO</sub>	Emitter to Base Voltage	V	2.0
I <sub>C</sub>	Collector Current mA	150	
P <sub>T</sub>	Total Power Dissipation	mW	200 (CW)
T <sub>j</sub>	Junction Temperature	°C	150
T <sub>STG</sub>	Storage Temperature	°C	-65 to +150

Note:

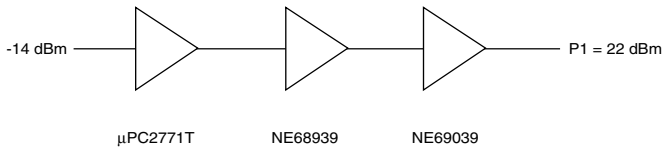
1. Operation in excess of any one of these parameters may result in permanent damage.

**APPLICATION**

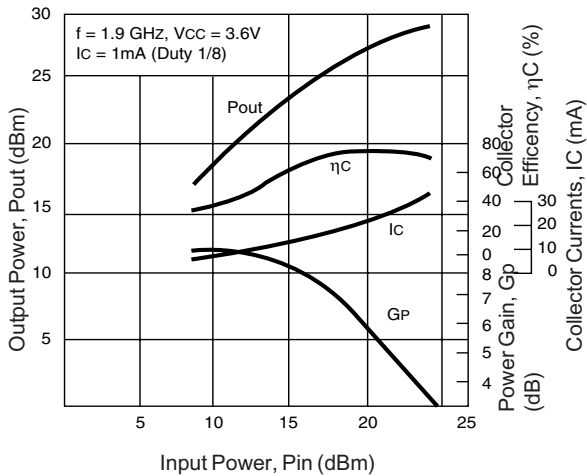
**(1) TX Amplifier for DECT**



**(2) TX Amplifier for PHS**



**OUTPUT POWER, COLLECTOR EFFICIENCY, COLLECTOR CURRENT AND POWER GAIN VS. INPUT POWER**

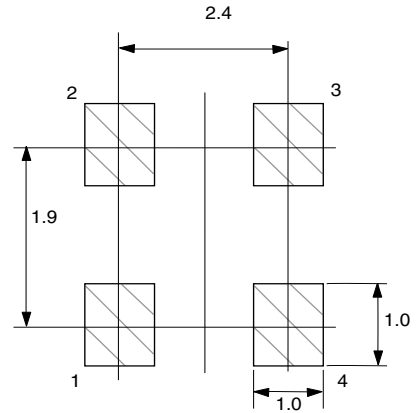


**TYPICAL DATA**

f = 1.9 GHz, V<sub>CC</sub> = 3.6 V, I<sub>CQ</sub> = 1 mA, DUTY = 1/8

P <sub>1dB</sub>	24.5	dbm
η <sub>C</sub>	62	%
I <sub>C</sub>	15	mA
GL	9.0	db

**OUTLINE 39 RECOMMENDED P.C.B. LAYOUT**



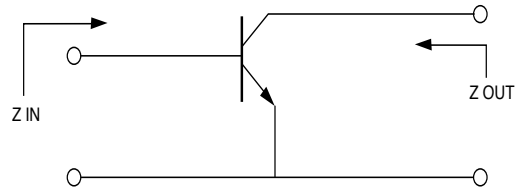
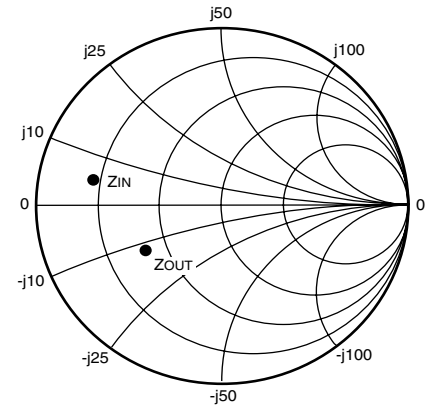
**ORDERING INFORMATION**

PART NUMBER	QTY
NE68939-T1-A	3K/REEL

Note:

1. Lead material: Cu  
Lead plating: PbSn

**Z<sub>IN</sub> (Ω), Z<sub>OUT</sub> (Ω) DATA**



**IMPEDANCE LOOKING INTO DEVICE**

V<sub>CC</sub> = 3.6 V, I<sub>CQ</sub> = 1 mA, CLASS AB

FREQUENCY (GHz)	Z <sub>IN</sub> (Ω)	Z <sub>OUT</sub> (Ω)
1.9	7.85+j5.62	21.9-j11.6
0.9	3.1+j11.6	5.3-j5.7

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DATA SUBJECT TO CHANGE WITHOUT NOTICE

07/05/2000

Subject: Compliance with EU Directives

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CEL Pb-free products have the same base part number with a suffix added. The suffix –A indicates that the device is Pb-free. The –AZ suffix is used to designate devices containing Pb which are exempted from the requirement of RoHS directive (\*). In all cases the devices have Pb-free terminals. All devices with these suffixes meet the requirements of the RoHS directive.

This status is based on CEL’s understanding of the EU Directives and knowledge of the materials that go into its products as of the date of disclosure of this information.

Restricted Substance per RoHS	Concentration Limit per RoHS (values are not yet fixed)	Concentration contained in CEL devices	
		-A	-AZ
Lead (Pb)	< 1000 PPM	Not Detected	(*)
Mercury	< 1000 PPM	Not Detected	
Cadmium	< 100 PPM	Not Detected	
Hexavalent Chromium	< 1000 PPM	Not Detected	
PBB	< 1000 PPM	Not Detected	
PBDE	< 1000 PPM	Not Detected	

If you should have any additional questions regarding our devices and compliance to environmental standards, please do not hesitate to contact your local representative.

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